

spatial information using a magnetic field gradient, rapid advances have led to the ability to produce tomographic or three-dimensional images with resolution rivaling x-ray computerized tomography. In contrast with radiography, the intensity of proton NMR images is largely related to the concentration of protons in water and lipids. In addition, relaxation times (T1 and T2) can be emphasized on NMR images by manipulating the timing of the radiofrequency pulses.⁸ These "relaxation times" are affected by the chemical environment and may provide additional clues to the presence of disease. For example, work at the Massachusetts General Hospital using an ischemic stroke model in cats showed that changes in the NMR image occur as early as two hours after ligation.⁹ Other important potentials of proton NMR imaging include the ability to depict blood flow patterns and the application of contrast-enhancing agents, such as paramagnetic molecular oxygen.

The progress from Lauterbur's concept in 1973 to proton images of high quality in 1982, coupled with the development of TMR, suggests a progression ultimately to methods that allow in vivo mapping of biochemical markers of cellular disease such as the measurement of high-energy phosphate levels, intracellular sodium pools and NMR tracers labeled with ¹³C. For NMR to achieve its full potential, there will have to be an alliance between technologic and medical research and among pathophysiologically, biochemically and structurally oriented practitioners. Indeed, the level of advancement that is necessary for knowledgeable NMR research and practice could lead to the evolution of a new discipline in medicine.

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Poison Control Centers—A Vital Community Resource

ON JULY 14, 1981, the state of California began spraying malathion over a wide area of northern California; on August 10, 1981, some 5,000 South San Francisco residents were evacuated after a silicon tetrachloride gas line ruptured; on September 2, 1981, there were 60,000 residents evacuated from downtown San Francisco after a polychlorinated biphenyl/methane gas explosion; on December 4 seven Laotians ate *Amanita phalloides* in Santa Rosa, California. In each of these toxic, or potentially toxic, circumstances, the San Francisco Bay Area Regional Poison Control Center was a focal information center for citizens, public and private agencies and the news media. These events vividly illustrate the expanding role of a poison control center and the importance of such a center as a vital community health resource.

Pediatricians and local health departments began organizing poison control centers in the early 1950's. These early centers attempted to provide information and referral as well as preventive programs for poisoning. Lovejoy and his colleagues¹ from Boston summarized the growth of poison centers in 1979. The experience of the Massachusetts Poison Control Center emphasized the importance of establishing regional poison control services in many states and showed that 45,000 calls handled during 1978 cost \$4 a call and were cost effective in decreasing the number of emergency room visits.¹

It is estimated that there are approximately 5 million accidental and deliberate poisonings per year, with approximately 5,000 deaths. As an accidental cause of death, poisonings are surpassed only by motor vehicle accidents, drowning and burns.² The expanding poison center activities provide vital links for health care services. There are currently some 650 poison centers in the United States, which are unevenly distributed. In California there are now three centers certified by the American Association of Poison Control Centers (Sacramento, San Diego and San Fran-

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cisco) providing unique expertise in their geographic areas. The San Francisco Bay Area Regional Poison Control Center, reviewed in this month's issue, makes an important contribution in disaster planning and coping with hazardous spills and occupational health problems.

Many benefits from poison control activities are evident. Toxicity information relayed by the poison control center is well received by health professionals and patients. Vital links between physicians, nurses, pharmacists, toxicologists and the community are forged on important environmental and toxicologic issues. Data collection in local communities allows for epidemiologic studies of toxic events. Special hazards with new drugs or packaging and labeling of toxic chemicals are more easily recognized. Unusual health problems such as epidemic mushroom poisoning can be recognized and prevented. Public reassurance via telephone consultation when there is little or no hazard provides cost-effective medical care.

Some problems remain as poison control cen-

ters evolve as community resources. There are far too many centers that lack quality control. Major gaps exist in important toxicologic information that will require new research strategies. There are internal conflicts in professional organizations concerned with poison control centers. Perhaps the most pressing problem involves maintaining stable funding resources for this cost-effective service for which no appropriate billing mechanism has been found. Departments of public health, emergency medical services systems and local professional organizations share a major responsibility in maintaining the funding for these activities.

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